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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,249	10/22/2003	Meng C. Hsieh	10390US01	5457

7590 06/13/2006

Attention: Eric D. Levinson
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Legal Affairs
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EXAMINER	
BERNATZ, KEVIN M	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/691,249	HSIEH ET AL.	
	Examiner	Art Unit	
	Kevin M. Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendments to claims 1 – 3, 5, 7 and 17 - 19, and addition of claims 28 - 30, filed on January 17, 2006, have been entered in the above-identified application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Request for Continued Examination

3. The Request for Continued Examination (RCE) under 37 CFR 1.53 (d) filed on January 17, 2006 is acceptable and a RCE has been established. An action on the RCE follows.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1 – 30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitation "Tg is at least about 60 °C" in claims 1 and 30 is not supported by the as-filed disclosure.

The limitation "calculated using the Fox equation" in claims 1, 2 and 30 is not supported by the as-filed disclosure.

The limitation "said hard resin has a Tg greater than a Tg of said soft resin" in claim 3 is not supported by the as-filed disclosure.

The limitation "said polyvinyl acetal polymer has a Tg greater than a Tg of said soft resin" in claim 5 is not supported by the as-filed disclosure.

The limitation "said polyurethane has a Tg greater than a Tg of said soft resin" in claim 7 is not supported by the as-filed disclosure.

The limitation "said hard resin component has a Tg at least about 2 °C greater than a Tg of the soft resin component" in claim 17 is not supported by the as-filed disclosure.

The limitation "the lower support layer binder system Tg is at least about 65 °C" in claim 28 is not supported by the as-filed disclosure.

The limitation "the lower support layer binder system Tg is from about 65 °C" in claim 29 is not supported by the as-filed disclosure.

In all the cases noted above, the Examiner notes that applicants do not have any support on how individual Tg's are measured, nor how a combined Tg is calculated (weighted average, etc?). Furthermore, the only numerical support that applicants have for "soft" and "hard" Tg values are those in claims 18 and 19. The Examiner acknowledges that the combined teaching of a soft resin with a Tg less than about 68

°C and a hard resin with a Tg greater than about 70 °C is *one* embodiment where the hard resin Tg is greater than the soft resin Tg. However, the scope of the above combined limitations is significantly different than simply saying that the Tg of the hard resin is greater than the Tg of the soft resin, as in present claim 3. As such, applicants do not have support for the scope in claims 1 – 30 because of the limitations noted above.

6. Claim 30 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The limitation that the lower support layer binder system Tg is lower than the Tg of the binder system for the magnetic upper layer is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Applicants' as-filed disclosure indicates that the use of a lower support layer binder having a Tg lower than the upper magnetic layer binder is critical and essential to the invention.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1 - 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants have not provided sufficient disclosure to enable one of ordinary skill in the art to adequately determine how applicants are measuring their glass temperatures[1]. Regardless of the new matter issue raised with the limitation "calculated using the Fox equation", the Examiner notes that there are several parameters which enter into Tg calculations using the Fox equation, including several which are strongly dependent on the molecular weight of the polymer. As such, simply reciting that the glass temperature was "calculated using the Fox equation" is still insufficient specificity where patentability may hinge on the actual values of the glass temperatures (i.e. the glass temperatures are a key and critical component to applicants' invention).

Furthermore, claims 3 – 10 and 17 – 22 recite mixtures of polymers yet fail to provide any description on how the combined Tg's are calculated. Is a weighed average used (as put forth by Fox), or are fully miscible blends required (which will show a single Tg only)? The Examiner notes that one of ordinary skill in the polymer art would *not* expect a mixture to exhibit a single glass temperature since finding polymers that are fully miscible/homogenized with each other is extremely difficult. It is highly unlikely that a random mixture would exhibit a single Tg, but instead a mixture of Tg's based on the number of amorphous polymers present in the mixture.

While the Examiner acknowledges that one of ordinary skill in the art would appreciate the concept behind applicants' claim to a glass temperature, the Examiner's concern stems from the fact that the glass temperature *values* appear to be a critical and essential feature to the disclosed invention. As such, it is incumbent upon the

[1] While typically referred to as a glass *transition* temperature, this is a misnomer since there is no

Examiner to insure that the claims are well defined with respect to the glass temperature since there can be a rather large variance depending on how glass temperatures are measured, not just with regard to the type of measurement (dilatometery , DSC, TMA, etc) but also with regard to how the measurements are performed (heating or cooling, and at what *rate* of heating and/or cooling)[2].

For the purpose of evaluating the prior art, the Examiner has interpreted the claims directed to the glass temperature as being met by any reported glass temperature values, regardless of how these values were obtained.

9. The term "substantially less cracking" in claim 1 is a relative term which renders the claim indefinite. The term "substantially less cracking" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. In addition, the Examiner notes that applicants are comparing versus a medium possessing "substantially identical binder systems", which includes the Tg limitations as well as the pigment size, etc. I.e. if the two are substantially identical without any specified difference required, then the cracking behavior will necessarily be substantially identical and not "substantially less". As such, the Examiner notes that all

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transition that actually occurs. At best it can be considered a pseudo-second order transition.

[2] Applicants are invited to consult the Examiner's PhD thesis "Viscoelastic Properties of Inorganic Glasses", particularly section 1.0 and 2.0 for further information on the glass temperature (available through UMI publishing – University of Pittsburgh, 1999). Additional literature related to the glass temperature and various means of measurement can be found in the thesis of Craig Bero, also available through UMI (Univ. of Pittsburgh). The Examiner has also attached several reference articles available on-line, including one of Fox and Flory's original articles detailing the Fox equation and it's dependence on molecular weight.

prior art will necessarily meet the claimed functional limitation provided that the prior art meets the rest of the claimed limitations.

10. The term "large" in claim 23 is a relative term which renders the claim indefinite. The term "large" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. What one person considers "large" is different than what another person may consider as "large". For the purposes of evaluating the prior art, any carbon black is deemed to meet the claimed limitations.

Claim Rejections - 35 USC § 103

11. Claims 1 – 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. Patent No. 5,908,683) in view of Meguro et al. (U.S. Patent No. 5,419,943), Miyoshi et al. (U.S. Patent No. 4,504,542), and Kubota et al. (U.S. Patent No. 6,037,037).

Regarding claims 1 and 30, Suzuki et al. disclose a dual-layered magnetic recording medium comprising a non-magnetic substrate having a front side and a back side, at least one lower support layer formed over the front side and at least one magnetic upper layer formed over said at least one lower layer (*col. 3, lines 16 – 24*), said magnetic upper layer comprising magnetic pigment particles (*ibid*), and a binder system therefor (*ibid*), said binder system for said lower support layer may have a Tg lower than a Tg of said binder system for said magnetic upper layer (*col. 13, lines 42 –*

61), wherein said lower support layer binder system may have a Tg at least about 60 °C (*col. 22, lines 30 – 36*), said magnetic recording medium having two edges.

Suzuki et al. fail to disclose the magnetic powder having an average length of less than about 75 nm.

However, Meguro et al. teach that it is preferable to use fine ferromagnetic particles overlapping applicants' claimed length limitation inorder to obtain good magnetic properties in a binder + particle magnetic layer (*col. 8, line 60 bridging col. 9, line 19*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Suzuki et al. to use ferromagnetic particles meeting applicants' claimed length limitations as taught by Meguro et al. inorder to obtain good magnetic properties in a binder + particle magnetic layer.

Neither Suzuki et al. nor Meguro et al. explicitly teach controlling the lower support binder system Tg to be at least 60 °C while also insuring that the Tg of the lower support binder system is less than that of the magnetic upper layer binder system.

However, Miyoshi et al. teach that the Tg of the subbing layer can be varied to effect the adhesive strength of the recording layer in a dual-layered recording medium (*Figures and col. 1, line 41 bridging col. 2, line 43*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine a optimal value of the glass transition temperature meeting applicants' claimed limitations by optimizing the results effective variable through routine experimentation, especially in view of the teachings in Suzuki et al. that glass transition temperatures up to 100 °C are

still suitable for use in the subbing layer (*col. 22, lines 30 – 36*). *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Miyoshi et al. further teach controlling the Tg of the lower support layer to be less than the Tg of the upper magnetic layer inorder to insure that "a stress concentration can be dispersed or relieved" (*col. 2, lines 23 – 28*). This is also taught by Kubota et al. for the inorder to insure that the recording medium possesses excellent calendaring and strength (*col. 3, lines 23 – 33*).

Regarding claims 2, 28 and 29, the combined teachings of Suzuki et al. and Miyoshi et al. would render the range of "about 60 °C to about 72 °C obvious for the reasons discussed above.

Regarding claims 3 – 10 and 17 - 22, Miyoshi et al. and Kubota et al. disclose using lower support layers and upper magnetic layers comprising multiple resins meeting the claimed Tg limitations (*Miyoshi et al. – col. 2, lines 3 – 21; Kubota et al., examples – e.g. col. 9, lines 16 – 31 and Table 1*) and material limitations (*Kubota et al., col. col. 5, lines 5 – 39 and examples*). See also Suzuki et al. (*col. 12, lines 30 – 59, which teach using combinations of resins*; *and col. 13, line 42 bridging col. 14, line 19, which teach against using a halogenated resin in the upper magnetic layer*).

Regarding claims 11 – 13, Suzuki et al. teach including lubricants meeting applicants' claimed limitations (*col. 8, lines 47 – 59; col. 9, line 66 bridging col. 10, line 5; col. 16, line 45 bridging col. 17, line 52*).

Regarding claim 14, Suzuki et al. disclose non-magnetic particles meeting applicants' claimed material limitations (*col. 5, lines 45 – 67*).

Regarding claim 15, Suzuki et al. disclose magnetic layers meeting applicants' claimed thickness limitation (*Examples – Table 1*).

Regarding claim 16, Suzuki et al. disclose magnetic coercivity values meeting applicants' claimed limitations (*col. 11, lines 16 – 300*.

Regarding claim 23, Suzuki et al. disclose adding spherical large carbon black to the magnetic layer (*col. 15, line 1 bridging col. 16, line 44*).

Regarding claim 24, the above relied upon art disclose the ferromagnetic pigment, the carbon particles, the mixture of binders including a polyurethane and a non-halogenated vinyl binder, a fatty acid ester lubricant and a fatty acid lubricant as noted above. Suzuki et al. further disclose aluminum oxide (*col. 15, line 55 bridging col. 16, line 44 and examples*) and hardeners (*col. 16, line 45 bridging col. 17, line 52 and examples*). See also Meguro et al. (*col. 17, line 57 bridging col. 18, line 9*).

Regarding claims 25 - 27, Suzuki et al. and Meguro et al. disclose that back coats meeting applicants' claimed limitations can be applied to insure good running performance (*Suzuki et al. - col. 19, lines 62 – 65; Meguro et al. – col. 5, lines 60 – 67; col. 10, lines 19 – 24, which teach that it is known in the art to use similar binder compositions for the back coat layer as in the magnetic and support layers; and col. 12, line 15 bridging col. 13, line 41*).

Response to Arguments

12. The rejection of claims 1 - 30 under 35 U.S.C § 112 – 1st and 2nd Paragraph

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection. In so far as they apply to the rejections of record, applicant(s) argue(s) that the Fox equation is known in the art, hence removing the indefiniteness of the limitation "Tg". The Examiner respectfully disagrees.

The Examiner notes that the Fox equation that applicants are referring to is the Fox equation to calculate a weighed average Tg for a multi-component system. This does not reflect *how* the actual initial Tg values are obtained. There is also a "Fox and Flory" equation, which is sometimes known as the Fox equation, which is used to estimate glass temperatures based on the molecular weight of a compound. But again, one needs to know what values of the various constants (and molecular weight) was used inorder to obtain the same estimated Tg values. Applicants do not have support for any of these necessary limitations. Furthermore, the Examiner notes that the Fox equation is not the only way to calculate an "average" Tg of a multi-component system, though the Examiner would argue that it is probably the most accurate.

Regarding the limitations "hard" and "soft", the Examiner maintains that these terms are relative terms, since even as admitted by applicants (*page 11 of response*), the relative meaning of "hard" and "soft" only pertains to relative Tg values "in one preferred embodiment" (*emphasis in original*). As such, the Examiner notes that one of ordinary skill in the art would not be readily appraised of what applicants' consider "hard" and what they consider "soft". The fact that applicants then argue that "hard" and

"soft" *are* directed to relative Tg limitations (*page 12 of response*) only further confuses the issue.

Finally, the Examiner notes that there appears to be some confusion as to what is deemed indefinite. The present specification is silent as to how each individual Tg is obtained. Either they are obtained via measurement (DSC, dilatometery, TMA, etc, all of which will show 1 or more Tg's depending on the system being measured), or they are theoretical Tg's based on pre-determined constants and molecular weight measurements. It is these values which are then plugged into the Fox equation to obtain a multi-component weighed Tg for those systems that have multiple components. However, the Examiner notes that claims 1 and 30 *do not require multiple components*, which is why there is some confusion by what applicants' mean by the claim limitation "calculated using the Fox equation". For a single component system, essentially applicants' are saying 1/Tg = 1/Tg. That's fine, but *how* was Tg determined? Since the actual magnitude of Tg is critical to the patentability of the disclosed invention, the fact that a measurement made on heating at 20 °C/min versus a measurement made on cooling at 0.2 °C/min can differ by as much as 10-20 °C clearly makes a huge difference in a situation where applicants are claiming situations where the difference in Tg's are merely 2 °C apart.

13. The rejection of claims 1 - 30 under 35 U.S.C § 103(a) – Suzuki et al. in view of various references

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
June 8, 2006

Kevin M. Bernatz, PhD
Primary Examiner